

IN THE CLAIMS:

Please AMEND the claims as follows:

1. (CURRENTLY AMENDED) An optical communication system comprising:
 - a transmitting station;
 - an optical transmission line for transmitting an optical signal sent from said transmitting station;
 - a receiving station for receiving said optical signal outputted from said optical transmission line;
 - a repeater station provided ~~at one point or more~~ in said optical transmission line between said transmitting station and said receiving station; and
 - a first pump light source, located provided in one of at least two of said transmitting station, said receiving station, and said repeater station, for supplying pump light at a first wavelength to said optical transmission line; and
 - a second pump light source, located in a different one of said transmitting station, said receiving station and said repeater station, supplying pump light at second wavelength, different from the first wavelength, to said optical transmission line, wherein the pump light at the first wavelength and the pump light at the second wavelength cause Raman amplification of said optical signal to occur in different spans of said optical transmission line, and thereby cause the optical signal to be amplified by a combined Raman amplification as the optical signal travels through the different spans, said pump light has two types or more of wavelengths the first and second wavelengths being selected to reduce gain tilt of the combined Raman amplification.

2. (CURRENTLY AMENDED) The optical communication system according to claim 1, wherein

said optical transmission line has a Raman gain as a function of wavelength in which an interval between a minimum value and a maximum value of a wavelength of said pump light coincides with a width of an amplifying wavelength band

when a maximum value first appeared after a Raman gain generated by said pump light starts showing coincides with a center wavelength of the amplifying wavelength band ~~to be amplified~~.

3. (CURRENTLY AMENDED) The optical communication system according to claim 1, wherein:

said pump light has a first wavelength and a second wavelength; and
said second wavelength is set so that a maximum value first appeared after a second
Raman gain generated by said pump light ~~with-at~~ said second wavelength starts showing
substantially coincides with

a local minimum value first appeared after a first Raman gain generated by said pump
light ~~with-at~~ said first wavelength starts showing, ~~on~~ said first wavelength.

4. (CURRENTLY AMENDED) The optical communication system according to
claim 1, further comprising:

~~a shielding part means provided in said optical transmission line inside a station;~~
~~for shielding said pump light, the station opposing said one or said different one of said~~
~~transmitting station, said receiving station and said repeater station to shield said opposing~~
~~station from residual pump light provided by said one or said different one of said transmitting~~
~~station, said receiving station and said repeater station to another station supplied with said~~
~~pump light, and being in a direction that said pump light transmits from said another station.~~

5. (CURRENTLY AMENDED) The optical communication system according to
claim 1, further comprising:

~~a residual light detecting means detector, provided in a station opposing said one~~
~~or said different one of said transmitting station, said receiving station and said repeater station,~~
~~for detecting optical power of residual pump light supplied by the pump light source in said one~~
~~or said different one of said transmitting station, said receiving station and said repeater~~
~~station of said pump light, the station opposing to another station supplied with said pump light,~~
~~and being in a direction that said pump light transmits from said another station;~~

~~an adjustor adjusting means provided in said one or said different one of said~~
~~transmitting station, said receiving station and said repeater station, adjusting optical power of~~
~~said pump light provided by said one or said different one of said transmitting station, said~~
~~receiving station and said repeater station so that a detection result from said residual light~~
~~detecting means detector falls within a predetermined fixed range; and~~

~~a detection result transmitting means for transmitter transmitting said detection~~
~~result from said residual light detecting means detector to said adjusting means adjustor.~~

6. (CURRENTLY AMENDED) The optical communication system according to
claim 1, further comprising:

a residual light detecting meansdetector, provided in a station opposing said one or said different one of said transmitting station, said receiving station and said repeater station, for detecting optical power of residual pump light of said the pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station, the station opposing to another station supplied with said pump light, and being in a direction that said pump light transmits from said another station;

a stopper, stopping means provided in a station supplied with said pump lightsaid one or said different one of said transmitting station, said receiving station and said repeater station, for stopping supply of said the pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station when a detection result from said residual light detecting meansdetector is equal to or lower than a predetermined value; and

a detection result transmitting means for transmitter transmitting said detection result from said residual light detecting meansdetector to said stopping meansstopper.

7. (CURRENTLY AMENDED) The optical communication system according to claim 1, further comprising:

an optical signal detecting meansdetector provided in said one or said different one of said transmitting station, said receiving station and said repeater station, a station supplied with said pump light, for detecting optical power of said optical signal; and

a stopperstopping means for stopping supply of said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station when a detection result from said optical signal detecting meansdetector is outside a predetermined fixed range.

8. (CURRENTLY AMENDED) The optical communication system according to claim 1, further comprising:

a reflected light detecting meansdetector provided in a station supplied with said pump lightsaid one or said different one of said transmitting station, said receiving station and said repeater station, for detecting optical power of reflected pump light of said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station; and

a stopperstopping means for stopping supply of said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater

station when a detection result from said reflected light detecting meansdetector is equal to or higher than a predetermined value.

9. (CURRENTLY AMENDED) The optical communication system according to claim 8, further comprising superimposing means for superimposing a low frequency on said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station, and wherein

said stopping means stopper detects said low frequency to verify said reflected pump light.

10. (CURRENTLY AMENDED) The optical communication system according to claim 1, further comprising:

a detectordetecting means provided in said one or said different one of said transmitting station, said receiving station and said repeater station, a station according to a pumping method of said pump light, for detecting optical power of said optical signal amplified by said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station; and

a stopperstopping means provided in said one or said different one of said transmitting station, said receiving station and said repeater station, a station supplied with said pump light, for stopping supply of said pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station when a comparison result between first and second detection results is within a predetermined range, the first detection result being obtained by said detecting means detector when a pump light having a first optical power is supplied to said power transmission line by the pump light source in said one or said different one of said transmitting station, said receiving station and said repeater station, the second detection result being obtained by said detecting means detector when a pump light having a second optical power larger than said first optical power is supplied to said optical transmission line by the pump light source in said one or said different one of said transmitting station, said receiving station and said repeater station.

11. (CURRENTLY AMENDED) An optical communication system comprising:
a transmitting station;
an optical transmission line for transmitting an optical signal sent from said

transmitting station;

a receiving station for receiving said optical signal outputted from said optical transmission line;

a repeater station provided at one point or more in said optical transmission line between said transmitting station and said receiving station; and

a first pump light source provided source, located in one of in at least two of said transmitting station, said receiving station, and said repeater station, for supplying pump light at a first wavelength to said optical transmission line, and

a second pump light source, located in a different one of said transmitting station, said receiving station and said repeater station, supplying pump light at a second wavelength, different from the first wavelength, to said optical transmission line, wherein the pump light at the first wavelength and the pump light at the second wavelength cause Raman amplification of said optical signal to occur in different spans of said optical transmission line, and thereby cause the optical signal to be amplified by a combined Raman amplification as the optical signal travels through the different spans, the first and second wavelengths being selected to reduce gain tilt of the combined Raman amplification; wherein

a detector, detecting means provided in said one or said different one of said transmitting station, said receiving station and said repeater station, said detector a station according to a pumping method of said pump light, for detecting optical power of said optical signal Raman amplified by said the pump light supplied by the pump light source located in said one or said different one of said transmitting station, said receiving station and said repeater station; and

a stopper stopping means provided in said one or said different one of said transmitting station, said receiving station and said repeater station, a station supplied with said pump light, for stopping supply of said the pump light supplied by the pump light source located in said one or said different one of said transmitting station, said receiving station and said repeater station, when a comparison result between first and second detection results is within a predetermined range, the first detection result being obtained by said detecting meansdetector when a the pump light supplied by the pump light source located in said one or said different one of said transmitting station, said receiving station and said repeater station having has a first optical power, is supplied to said power transmission line, the second detection result being obtained by said detecting meansdetector when a the pump light supplied by the pump light source located in said

one or said different one of said transmitting station, said receiving station and said repeater station having-has a second optical power larger than said first optical power-is supplied to said optical transmission line.

12. (CURRENTLY AMENDED) An optical communication system comprising:
a transmitting station;
an optical transmission line for transmitting an optical signal, which has a plurality of first and second wavelength bands and is sent from said transmitting station;
a receiving station for receiving said optical signal outputted from said optical transmission line;
a repeater station provided at one point or more in said optical transmission line between said transmitting station and said receiving station; and
a first pump light sources provided source, located in one of in at least two of said transmitting station, said receiving station, and said repeater station, for supplying pump light at a first wavelength corresponding to the first wavelength bands a plurality of pump lights in correspondence with said plurality of wavelength bands, to said optical transmission line, so that Raman amplification of said optical signal occurs in the first wavelength band;
a second pump light source, located in a different one of said transmitting station, said receiving station and said repeater station, supplying pump light at a second wavelength corresponding to the second wavelength band to said optical transmission line, so that Raman amplification of said optical signal occurs in the second wavelength band;
a band detecting means detector provided in a station according to a pumping method of said pump light, for detecting optical power of said optical signal amplified by said first and second pump light lights in each of said plurality of said first and second wavelength bands; and
a band adjustor adjusting means provided in a station provided with said pump light source, for adjusting optical powers of said plurality of first and second pump lights according to a detection result from said band detecting means detector so as to keep optical power detected in said each of said first and second wavelength band-bands within a predetermined fixed range.

13. (CURRENTLY AMENDED) The optical communication system according to claim 12, wherein:

said plurality of first and second wavelength bands is-are C-band and L-band,

respectively; and

said plurality of first and second pump lights has are at wavelengths of 1440 nm and 1485 nm, respectively.

14. (CURRENTLY AMENDED) The optical communication system according to claim 12, wherein at least one of the first and said second pump light source-sources is a laser light source which oscillates laser lights with wavelengths of 1440 nm, 1450 nm, and 1485 nm, the optical communication system further comprising

a controller control means provided in a station provided with said pump light source, for controlling said pump light source to output:- said laser light with the wavelength of 1450 nm when only said optical signal having the C-band are-wavelengths is transmitted, said laser light with the wavelength of 1485 nm when only said optical signal having the L-band wavelengths are-is transmitted, and said laser lights with the wavelengths of 1440 nm and 1485 nm when said optical signal having the having both C-band and the L-band are wavelengths is transmitted.

15. (CURRENTLY AMENDED) The optical communication system according to claim 12, further comprising:

a shieldshielding means provided in said optical transmission line inside a station opposing said one or different one of said transmitting station, said receiving station and said repeater station to shield said opposing station from residual pump light provided by said one or said different one of said transmitting station, said receiving station and said repeater station to another station supplied with said pump lights, and being in a direction that said pump lights transmit from said another station.

16. (CURRENTLY AMENDED) The optical communication system according to claim 12, further comprising:

a residual light detecting means-detector provided in a station opposing said one or different one of said transmitting station, said receiving station and said repeater station to another station supplied with said plurality of pump lights and being in a direction that said pump lights transmit from another station, for detecting optical power of residual pump light of each of said pump lights from said one or different one of said transmitting station, said receiving station and said repeater station;

an adjustoradjusting means provided in said one or different one of said

transmitting station, said receiving station and said repeater station, a station supplied with said plurality of pump lights, for adjusting optical power of each of said pump lights light supplied by the pump light source in said one or different one of said transmitting station, said receiving station and said repeater station so that a detection result from said residual light detecting meansdetector falls within a predetermined fixed range; and

a detection result transmitting means for transmitter transmitting said detection result from said residual light detecting meansdetector to said adjusting meansadjustor.

17. (CURRENTLY AMENDED) The optical communication system according to claim 12, further comprising:

a residual light detecting meansdetector provided in a station opposing to said one or different one of said transmitting station, said receiving station and said repeater station, another station supplied with said plurality of pump lights, and being in a direction that said pump lights transmit from another station, for detecting optical power of residual pump light from said one or different one of said transmitting station, said receiving station and said repeater station of each of said pump lights;

a stopper stopping means provided in a station supplied with said plurality of pump lights, for stopping supply of said pump light pump light from said one or different one of said transmitting station, said receiving station and said repeater station when a detection result from said residual light detecting meansdetector is equal to or lower than a predetermined value; and

a detection result transmitting means for transmitter transmitting said detection result from said residual light detecting meansdetector to said stopping meansstopper.

18. (CURRENTLY AMENDED) The optical communication system according to claim 12, further comprising:

an optical signal detecting meansdetector provided in said one or different one of said transmitting station, said receiving station and said repeater station, a station supplied with said plurality of pump lights, for detecting optical power of said optical signal; and

a stopper stopping means for stopping supply of said plurality of pump lights pump light provided by the pump light source in said one or different one of said transmitting station, said receiving station and said repeater station when a detection result from said optical signal detecting meansdetector is outside a predetermined fixed range.

19. (CURRENTLY AMENDED) The optical communication system according to claim 12, further comprising:

a reflected light detecting means~~detector~~ provided in said one or different one of said transmitting station, said receiving station and said repeater station,~~a station supplied with~~ said plurality of pump lights, ~~for detecting optical powers~~power of reflected pump lights of said plurality of pump lights~~light~~; and

a stopper stopping means for stopping supply of said plurality of pump lights pump light from said one or different one of said transmitting station, said receiving station and said repeater station when a detection result from said reflected light detecting means~~detector~~ is equal to or higher than a predetermined value.

20. (ORIGINAL) A method for supplying pump light used for Raman amplification in an optical transmission line, comprising:

a first step of supplying pump light having a first optical power to said optical transmission line;

a second step of detecting optical power of light Raman-amplified by said pump light having said first optical power;

a third step of supplying pump light having a second optical power larger than said first optical power, to said optical transmission line;

a fourth step of detecting optical power of light Raman-amplified by said pump light having said second optical power; and

a fifth step of giving a warning about anomaly occurring at a supplying destination of said pump light when a comparison result between detection results of the second step and the fourth step is within a predetermined range.

21. (ORIGINAL) The method according to claim 20, further comprising a step of stopping supply of said pump light when said warning is given.

22. (ORIGINAL) A method for supplying pump light used for Raman amplification of an optical signal having two wavelength bands in an optical transmission line, comprising:

a first step of supplying a first pump light at a predetermined value to said optical transmission line, the first pump light exciting an optical signal having a first wavelength band;

a second step of detecting optical power of said optical signal having said first wavelength band;

a third step of detecting optical power of an optical signal having a second wavelength band different from said first wavelength band; and

a fourth step of adjusting a second pump light so that both detection results of said second and third steps fall within a predetermined fixed range, the second pump light exciting said optical signal having said second wavelength band.

23. (CURRENTLY AMENDED) A distributed Raman amplifying apparatus, wherein:
a plurality of pump lights is supplied from at least two different points in an optical transmission line, ~~which transmits an optical signal~~ the plurality of pump lights being at different wavelengths and causing Raman amplification of an optical signal traveling through the optical transmission line to occur in different spans of the optical transmission line, respectively, to thereby cause the optical signal to undergo a combined Raman amplification by traveling through the different spans, wherein the different wavelengths are selected to reduce gain tilt of the combined Raman amplification.; and
~~said plurality of pump lights has two types or more of wavelength.~~

24. (NEW) The optical communication system according to claim 1, further comprising:

a controller centrally controlling settings of the first and second wavelengths through communication lines to the first and second pump light sources, to reduce the gain tilt.

25. (NEW) The optical communication system according to claim 11, further comprising:

a controller centrally controlling settings of the first and second wavelengths through communication lines to the first and second pump light sources, to reduce the gain tilt.

26. (NEW) An optical communication system comprising:

a first pump light source, located in a respective repeater station of a plurality of repeater stations provided along an optical transmission line between a transmitting station and a receiving station, the plurality of repeater stations amplifying an optical signal traveling through the optical transmission line from the transmitting station to the receiving station, the first pump light source supplying pump light at a first wavelength to the optical transmission line; and

a second pump light source, located in one of a different respective repeater

station of the plurality of repeater stations, the transmitting station and the receiving station, the second pump light source supplying pump light at second wavelength, different from the first wavelength, to the optical transmission line, wherein

the pump light at the first wavelength and the pump light at the second wavelength cause Raman amplification of the optical signal to occur in different spans of the optical transmission line, respectively, to thereby cause the optical signal to be amplified by a combined Raman amplification as the optical signal travels through the different spans, and

the first and second wavelengths are selected to reduce gain tilt of the combined Raman amplification.

27. (NEW) The optical communication system according to claim 26, further comprising:

a controller centrally controlling settings of the first and second wavelengths through communication lines to the first and second pump light sources, to reduce the gain tilt.

28. (NEW) The optical communication system according to claim 26, wherein:

the second wavelength is set so that a maximum value first appeared after a Raman gain generated by the pump light at said second wavelength starts showing substantially coincides with a local minimum value first appeared after a Raman gain generated by the pump light at the first wavelength starts showing.

29. (NEW) The optical communication system according to claim 27, wherein:

the second wavelength is set so that a maximum value first appeared after a Raman gain generated by the pump light at said second wavelength starts showing substantially coincides with a local minimum value first appeared after a Raman gain generated by the pump light at the first wavelength starts showing.